

Patent Application of Paul Curtis Hynek for "Waterproof, Tear-Resistant Accordion Book with Magnetic Covers and Method of Making Same" continued

1

Patent Application of

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for

TITLE: WATERPROOF, TEAR-RESISTANT ACCORDION BOOK  
WITH MAGNETIC COVERS AND METHOD OF MAKING SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of PPA Ser. Nr. 60/464,620, filed 2003 April 22.

FEDERALLY SPONSORED RESEARCH	Not Applicable
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SEQUENCE LISTING OR PROGRAM	Not Applicable
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## BACKGROUND – FIELD OF INVENTION

This invention relates to a method of book construction, specifically to a book construction that is waterproof and tear-resistant.

## BACKGROUND – DISCUSSION OF PRIOR ART

Conventionally bound books have long been known to the art. Conventionally bound books, however, permit the reader to view only two pages at once.

Scroll-bound books, such as the Torah, also have long been known to the art. Scroll-bound books, however, do not afford the reader the ability to transfer to nonadjacent sections easily.

Books with sheet material folded accordion-style and with magnetic covers are known to the art. Accordion-style folding allows the user to open the folds and spread all the pages flat to view a plurality of pages simultaneously. Books with sheet material folded accordion-style but without magnetic covers have been known for over twenty years. Such books often have regular paper and black and white content inside. They have no external magnetism and thus are not adhereable to a refrigerator or other magnetically attractive surface.

Magnetic covers keep the books closed without the need for additional securing means such as clasps or rubber bands, even in environments that are often packed hurriedly and haphazardly, such as purses and glove compartments. Magnetic covers also allow the books to be attached to a magnetically attractive surface such as a refrigerator door.

Fodors LLC, a wholly-owned subsidiary of Random House, Inc. based in New York NY, markets a line of such magnetic, accordion fold books for travelers. They have color content inside, magnet covers that hold the book together, external magnetism to adhere to other magnetically susceptible surfaces, and printed sheet material made of regular paper.

Tag-Master also markets co-branded promotional magnetic address books; these have no external magnetism. Most often, they have black and white content inside and use regular paper for the pages.

Books with magnetic covers but without the printed material folded accordion-style are also known to the art. Engel, in US Pat. No. 5,702,126 (1997), shows a miniature book with a permanent magnetic cover to adhere the book to magnetically susceptible surfaces; alternatively, both covers can be permanent magnets. Engel, in US Pat. No. 5,709,409 (1998), shows a spiral bound book where not only one of the covers, but the pages themselves, can incorporate permanent magnets so as both to adhere to magnetically susceptible surfaces and also to allow the selected page to remain open in the desired position.

Books of waterproof construction are also known to the art. Lackey et al., in published patent application US20020,011,729 (2001), shows a waterproof book in which readers enter personal medical data. Melcher, in published patent application US20010,041,114 (1999), teaches a waterproof book with detailed recommendations for the synthetic paper, glue, and thread; it is marketed under the trademark of "Durabooks." Japanese Pat. No. 9-183278 (1997) to Suzuki shows waterproof books used in a variety of applications; however, these books are bound conventionally and do not have magnet covers.

Books that float are reflected in US Pat. No. 5,464,253, Farrell (1995).

The above Japanese patent to Suzuki shows a children's book that can squirt water from an elephant's trunk

Books with tear-off coupons can be seen in US Pat. Nos. 1,972,665, Miller (1934), and 2,813,728, Harris (1957), and have been in the commercial marketplace as at least since 1987.

Flexible sheet material that can accept printing, which can be immersed in water, and which is virtually impossible to tear by hand is also known to the art.

## BACKGROUND--OBJECTS AND ADVANTAGES

Accordingly, one primary object of the present invention is to provide an improved book construction, specifically a book that allows the user to view a plurality of pages simultaneously, even in an extreme environment and where the book is subject to rough usage. At the same time, however, the reader can flip through the pages as with a bound book in situations where this is desirable, such as discreetly under a restaurant table.

Other objects are to provide a book that, once closed, automatically remains closed until the user chooses to open it; that permits more content than other books with sheet material folded accordion-style; that can adhere to a magnetically susceptible surface; that although of a waterproof substance, still allows the user to write on it with either pen or pencil, and in the case of a pencil, to erase the writing when desired; that is relatively thin when closed; that avoids using magnets strong enough to interfere with magnetically

recorded material, such as is to be found on credit cards placed close to the book; that provide a tear-off coupon or coupons that extend from one of the folded sheet, without affecting the integrity of the main body of the book; that can float in water; and that offers the reader the ability to read a plurality of pages simultaneously.

Further objects and advantages will become apparent from a consideration of the ensuing description and drawings.

#### SUMMARY

In accordance with the present invention a novel book or device for storing and presenting printed material comprises a single sheet of flexible, waterproof, tear-resistant, accordion-folded printed material. Material for stiffening both portions of the accordion-folded printed material is provided distal to the outermost folds. One or both pieces of the stiffening material are capable of exerting a magnetic attraction, whereby the printed material can be stored conveniently and compactly, and presented to the user under adverse conditions.

#### DRAWINGS -- FIGURES

Fig 1 is an isometric view of the book construction of the present invention in a closed position.

Fig 2 is an isometric view of the book construction of the present invention in an open position.

Fig 3 is a side view of the book construction.

Fig 4 shows an alternative embodiment of the book construction, showing tear-off coupons.

Fig 5 shows an alternative embodiment of the book construction, illustrating its ability to float in water.

#### DRAWINGS -- REFERENCE NUMERALS

10	front cover material
12	front cover
14	rear cover
16	rear cover material
22	sheet
24	score on one side of page
26	score on other side of page
28	Perforated edge of page
32	Tear-off pages
60	Buoyant layer

#### DETAILED DESCRIPTION--PREFERRED EMBODIMENT--FIGS. 1-3

Fig 1 shows a perspective view of the present book construction in a closed position. Although it can be made in any number of dimensions, including irregular die-cuts, the preferred embodiment is 8.2 cm high by 5.7 cm wide. The book is comprised of a front cover **12**, a rear cover **14**, and a sheet **22** that has been scored and folded so that the folds lie on one side **24** and on the other side **26** in an accordion fashion. Front cover **12** and rear cover **14** are composed of magnetic material that emits a strong enough magnetic field that, when in the closed position as shown, are drawn to each other, thereby securing folded sheet **22** in place and preventing it from opening unless the user desires to do so by forcefully separating the front and back covers enough to overcome the magnetic hold.

Front and rear covers **12** and **14** have a strong enough magnetic pull to attract one another despite the presence of the intervening folded sheet material **22**, yet the magnetic pull is weak enough to allow a user to easily pull the covers apart. They also allow the book to adhere to a magnetically susceptible surface such as a steel refrigerator door or an iron cabinet, yet allow the user to pull it off such surface.

Fig 2 shows the book in an open position. In this view the opposing sides **24** and **26** can be clearly seen. The respective ends of sheet **22** are adhered to the insides of covers **12** and **14** by adhesive. This format of book construction allows the user to view the entire contents of either side of sheet **22** at one time.

Fig 3 shows a side view of the book construction where the folded accordion pleated sides **24** and **26** of sheet **22** are clearly seen.

The preferred embodiment for sheet **22** is Category 5 polypropylene, sold under the trademark Yupo by Yupo Corporation America, Chesapeake, VA. Other materials can be used, such as high density polyethylene, sold under the trademark Tyvek by the E.I. du Pont de Nemours Company, Wilmington, DE; and durable polyolefin, sold under the trademark Kimdura by the Avery Dennison Corporation, Pasadena, CA. Yupo® is preferred over Tyvek® and Kimdura® as it has superior folding qualities, is less fibrous, and importantly, has superior print quality. It is resistant to many acids, alkalis, solvents and oils, as well as water and other common liquids. It is also ISO 14001 certified, recyclable, and remains inert in approved landfills.

Sustained experimentation showed that the presently preferred thickness of sheet **22** is 0.009 cm. Thicker weights require stronger magnetic covers **12** and **14**, which results in increased price, more potential negative externalities regarding interference with nearby

magnetic media, and difficulty in separating the covers **12** and **14** for those whose digital strength and/or dexterity is not great. Thinner weights do not provide adequate opacity.

The permanent magnetic covers are relatively stiff, affording firmness to the product. The presently preferred embodiment for magnetic covers **12** and **14** is anisotropic rubber. The magnetic strength emitted towards sheet **22** is stronger than that emitted towards front and rear cover materials **10** and **16** so as to securely hold the book together, allow the book to adhere to a magnetically attractive surface, but not emit so much magnetic strength to the outside so as to cause as little interference with items such as credit cards etc., although AlNiCo and others are possible choices as well.

The synthetic material is also preferably affixed to the outsides of the magnetic covers, which are 0.6mm thick, but can also be either 0.8 mm or 1.0 mm, thus making the covers effectively waterproof.

A thin coat of varnish, or similar substance, is applied to the surface of the synthetic material on both front and rear covers **12** and **14** and sheet **22**, in order to prevent scuffing and fading.

#### OPERATION -- FIGS. 1-3

Front cover and rear covers **12** and **14** serve to stiffen and protect sheet **22**. They can be made of magnetic material or non-magnetic material, as required.

The book is opened by pulling front and rear covers **12** and **14** sufficiently apart to overcome their magnetic attraction for each other. Pulling front and rear covers **12** and **14** further apart serves to spread accordion-folded sheet **22**, thus making sheet **22** flat and



making visible the printed material thereon. The book is closed by bringing together front and rear covers **12** and **14**, thus allowing sheet **22** to regain its accordion pleat, and thus allowing front and rear covers **12** and **14** to again attract each other magnetically.

#### Advantages

From the description above, a number of advantages of my waterproof, tear-resistant accordion book become evident:

(a) Magnetic front and rear covers **12** and **14** keep the books closed without the need for additional securing means such as clasps or rubber bands, even in environments that are often packed hurriedly and haphazardly, such as purses and glove compartments. Magnetic front and rear covers **12** and **14** also allow the books to be attached to a magnetically susceptible surface such as a refrigerator door.

(b) The information on the opposite side of sheet **22** can be printed upside down with respect to the front side. This format allows the user to more quickly access the information on the reverse side. My research has shown that, when the printed material is arranged in a vertical plane such that the covers are separated horizontally, rotating it 180° about a horizontal axis is effected more quickly than rotating it 180° about a vertical axis.

(c) Because these books are waterproof, and because tear-resistant material is used for sheet **22**, they can withstand rough usage and inadvertent spillage by young children. Such books are also perfectly suited for the armed forces, or for outdoor activities such as camping and scuba diving, as well as being handy nautical reference guides that magnetically adhere to steel boat dashboards.

(d) Because the material used for sheet **22** is tougher than conventional paper, it can be made thinner and still retain adequate durability. Because sheet **22** can be made thinner, more folds can be made it (akin to permitting more pages in a conventionally bound book) within a given thickness of book. There is a distinct limit to the cover-to-cover spacing of any book that is intended to be kept closed by means of its magnetic covers. Thus, stronger sheet material permits thinner sheet material, which permits more folds in the sheet material (akin to more pages), which permits more book content.

(e) Alternatively, the thinness of sheet **22** afforded by the toughness of its material permits a book with a given number of folds in it (akin to a fixed number of pages in a conventionally bound book) to be made thinner. This, in turn, permits front and rear covers **12** and **14** to be made with less magnetic intensity while still performing adequately their intended functions of (1) keeping the closed book closed and (2) attaching it to a vertically oriented, magnetically susceptible surface such as a refrigerator door. Magnets of lower strength are not only less expensive, but they are also less likely to damage magnetically vulnerable materials, such as credit cards, in their vicinity. This advantage is specific to the combination of accordion books with magnetic covers and thin sheet **22** permitted by the high strength of the waterproof, tear-resistant material; this advantage constitutes an unexpected result of this novel combination.

#### DETAILED DESCRIPTION -- ALTERNATIVE EMBODIMENTS -- FIGS. 4-5

Fig 4 shows an alternative embodiment where sheet **22** extends beyond rear cover **14**. This extension of sheet **22** is folded into several additional pages **32**, all of which can be removed by the reader at a line of perforations **28**, so that the part of the book between front and rear covers **12** and **14** maintains its structural integrity.

Fig 5 shows an alternative embodiment where a buoyant layer **60** is affixed to the outside of the book so as to enable the book to float in water. Cork was found to have insufficient buoyancy; that is, it required an excessively thick layer of cork to render the book buoyant. It is advantageous to have layer **60** in approximately the same width and length as the book itself, and approximately one and a half times as thick as the book. It can be affixed to front cover **12** or rear cover **14**. A sheet of synthetic material is then applied on its outmost face to serve as the front cover. This method still allows the book to be magnetically adhered to a magnetically susceptible surface via rear cover **14**. Waterproof glue can be employed to attach front and rear covers **12** and **14** to buoyant layer **60**, thus enabling the entire book to stay underwater for months and more.

#### OPERATION – ALTERNATIVE EMBODIMENTS FIGS. 4-5

The user, upon opening the book in Fig. 4 encounters, in this example, three additional pages **32** extending from the right-most edge of sheet **22**. More than three additional pages **32** extending from the right-most edge, and/or additional pages can extend from the left-most edge, and/or additional pages can extend from the top and/or bottom. In any of these cases, the user can detach a coupon, registration form, or other form of interactive or informational material while not affecting the overall structural integrity of the book.

## CONCLUSION, RAMIFICATIONS, AND SCOPE OF INVENTION

Thus the reader will see that the construction of my book provides a compact, durable, convenient, and waterproof item well suited to numerous purposes, both indoors and outdoors. The reader can view a plurality of pages simultaneously or flip through pages, as desired. Once closed, the book remains closed magnetically. The book can adhere to a magnetically susceptible surface. The book is waterproof, and can be made to float. The sheet material of this book is tear resistant, except when perforated to provide tear-off coupons.

However, the present invention confers a further advantage that is more than merely the sum of the advantages enjoyed by books with sheet material folded accordion-style and with magnetic covers, and of the advantages enjoyed by using waterproof, tear-resistant sheet material in a book. This important, additional advantage, which accrues specifically to the use of such durable sheet material in books with sheet material folded accordion-style and with magnetic covers, is that the books can contain more printed content. The high strength of the sheet material in the present invention permits the use of much thinner sheet material than is possible with ordinary cellulosic paper, hence more printed content in a book of a given thickness.

This waterproof, tear-resistant sheet material is so strong, in fact, that the minimum thickness of it that is employed in the preferred embodiment is not determined by strength. Were the synthetic material of the preferred embodiment made so thin that its strength equaled that of ordinary paper, it would be insufficiently opaque to prevent the printing on the reverse side from being visible on the front side whenever light was incident on the back side. Opacity considerations thus dictate that the minimum usable

thickness of the synthetic material, while much less than that of ordinary paper, be enough that it is much stronger than ordinary paper.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplifications of one preferred embodiment thereof. Many other variations are possible. For example, the size can be bigger or smaller than that suggested in this application. The book can also have an irregular shape; for example, it can be die-cut into the planar projection of anything from an automobile to a pizza box to a beverage glass. Various materials other than Category 5 polypropylene can be applied to the outside of front cover **12**, such as leather, plastic, etc., to give a different feel or functionality.

Instead of employing buoyant layer **60**, the book can also be made to float with a pocket of trapped air, or with various kinds of foam of some kind, which, for example, can be looped through a small hole in one of the corners of the book.

Magnets may also be omitted, for example, when the book is intended to be slipped into a wallet or purse. In this situation, a thin sleeve, made of plastic or other materials, would serve to protect the book and keep it compacted when extracted from a wallet or purse.

Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.